

CLAIMS

1. Apparatus for mixing the plural components of a plural component material and dispensing the mixed plural component material, comprising

a housing including a connection portion at its forward end and an actuator portion at its rearward end;

a mixing and dispensing element formed with opposed planar side portions, a mixing chamber within the element between the planar side portions, a pair of admission openings, one admission opening extending between each of the planar side portions and the mixing chamber, and a dispensing orifice in communication with the mixing chamber at the forward end of the mixing and dispensing element, said mixing and dispensing element being slidably carried by the connection portion of the housing;

a connection block for each of the plural components carried by the connection portion of the housing, one connection block being carried on each side of the connection portion of the housing with a side surface interfacing with a planar side portion of the mixing and dispensing element, each connection block providing means for connecting a supply of one of the plural components with the mixing chamber of the mixing and dispensing element and including an internal supply passageway leading to an outlet opening in its side surface, the side surface of each of said connection blocks carrying a seal element around its outlet opening that slidably engages the interfacing planar side portion of the mixing and dispensing element and seals the interface between the connection block and the mixing and dispensing element;

an air-operated actuator carried by the actuator portion of the housing for sliding the mixing and dispensing element with respect to the connection portion of the housing between a rearward position at which the admission openings of the mixing and dispensing element communicate with the outlet openings of the connection blocks, permitting a flow of the plural components into the mixing chamber for mixing and dispensation, and a forward position at which the outlet openings of the connection blocks are blocked by the planar side portions of the mixing and dispensing element, said air-operated actuator comprising a cylinder-forming wall in the actuator portion of the housing and a dual piston element slidably carried within the cylinder-forming wall and extending forwardly for connection with the mixing and dispensing element, said dual piston element comprising a forward piston and a rearward piston slidably sealed with the cylinder-forming wall and a cylinder-dividing element slidably carried by a connecting rod extending between the forward and

rearward pistons, said cylinder-dividing element being sealed with and held stationary within the cylinder-forming wall of the actuator portion of the housing, whereby the actuator portion of the housing is provided with a first piston/cylinder portion with the forward piston being drivable therein and a second piston/cylinder portion with the rearward piston being drivable therein, the driving forces of said forward piston and rearward piston being combined in sliding the mixing and dispensing element between its forward and rearward positions.

2. The apparatus of claim 1 wherein the cylinder-forming wall includes a forward portion with a smaller diameter and a rearward portion with a larger diameter and a transverse wall therebetween, and the cylinder-dividing element is seated against the transverse wall and held stationary.

3. The apparatus of claim 1 wherein a handle with a trigger is connected to the housing and includes a trigger-operated four-way air valve for operation of the air-operated actuator, said trigger being urged to an unpulled position by a spring; wherein the housing includes a compressed air inlet and air passageways leading from the compressed air inlet to the four-way valve and to an air chamber adjacent the admission openings of the mixing and dispensing element in its forward position; wherein when the trigger is pulled, compressed air is directed by the four-way valve and the air passageways of the housing into the first and second piston/cylinder portions of the housing forwardly of the forward and rearward pistons, respectively, driving the mixing and dispensing element to its rearward position, dispensing mixed plural component material; and wherein when the trigger is released and urged to its unpulled position by the spring, compressed air is directed by the four-way valve and the air passageways of the housing into the first and second piston/cylinder portions of the housing rearward of the forward and rearward pistons, respectively, driving the mixing and dispensing element to its forward position, blocking the flows of the plural component material into the mixing chamber, and positioning the admission openings of the mixing and dispensing element in the air chamber and expelling mixed plural component material residue from the mixing chamber and dispensing orifice of the mixing and dispensing element.

4. The apparatus of claim 3 further comprising means for connecting a compressed air inlet formed in the housing with a source of compressed air, comprising a manually operated on/off valve between the source of compressed air and the compressed air inlet, a first opening in communication with the air passageways in the housing leading to the four-way valve, a second opening in communication with the air passageway leading to the air

chamber, and a ball check valve between the first and second openings which is open in the presence of compressed air at the first opening and closed in the absence of compressed air at the first opening, thereby preventing plural component material from flowing back into the first opening and the air passageways leading to the four-way valve and air-operated actuator.

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5. In an apparatus for mixing the components of a plural component material and dispensing mixed plural component material, comprising a hand gun including means, carried by a hand gun housing, for the controlled mixing and dispensation of the plural component material, said means including a mixing chamber, a dispensing orifice in communication with the mixing chamber and a valve for controlling the flows of the components of the plural component material into the mixing chamber, and a trigger-operated air actuator for said valve, the improvement wherein said air actuator comprises two serially-connected pistons operating along a common axis within two separate cylinder portions of the hand gun housing, said two separate cylinder portions being connectable with a source of compressed air to drive said serially-connected pistons in the same direction by the application of compressed air to the two separate cylinder portions controlled with said trigger.

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6. The apparatus of claim 5 wherein the two separate cylinder portions are formed within a common cylindrical cavity of said hand gun housing by a cylinder-dividing member slidably carried on a connecting rod extending between the two serially-connected pistons.

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7. The apparatus of claim 5 further comprising a compressed air inlet formed in the housing, and means for connecting the compressed air inlet formed in the housing with a source of compressed air, comprising a first opening in communication with air passageways in the housing leading to the valve and two separate cylinder portions, a second opening in communication with an air chamber in communication with the mixing chamber, and a ball check valve between the first and second openings which is open in the presence of compressed air at the first opening and closed in the absence of compressed air at the first opening, thereby preventing plural component material from flowing back into the first opening and the air passageways leading to the valve and two separate cylinder portions.

8. An apparatus for mixing and dispensing plural component materials, comprising a housing including a connection portion, an actuator portion and a compressed air inlet;

means for the controlled mixing and dispensation of a plural component material carried by the connection portion of said housing, said means including a mixing chamber, a dispensing orifice in communication with the mixing chamber and a valve for controlling the flows of the components of the plural component material to the mixing chamber,

5 an air-operated actuator for said valve carried by the actuator portion of said housing, said air-operated actuator comprising two serially connected pistons operating along a common axis within two separate cylinder portions of a common cylindrical cavity formed in the actuator portion of said housing, said housing including air passageways leading from the compressed air inlet to the two separate cylinder portions of the housing, with two air
10 passageways leading to each of the two separate cylinder portions, one passageway of each pair leading to each of the opposite sides of the piston in each separate cylinder portion;

an air valve between the compressed air inlet and the air passageways for the controlled application of compressed air to the two separate cylinder portions, said air valve controlling the application of compressed air to the two separate cylinder portions to drive the
15 two serially connected pistons in the same direction along their common axis to provide the flows of the plural components into the mixing chamber when the two serially connected pistons are driven in one direction and to block the flows of the plural components to the mixing chamber when the two serially connected pistons are driven in the other direction; and

means for connecting the compressed air inlet to a source of compressed air
20 comprising a first opening in communication with the air passageways for the controlled application of compressed air to the two separate cylinder portions, a second opening in communication with means in the connection portion of the housing for directing a flow of compressed air through the mixing chamber and dispensing orifice when the flows of the plural components are being blocked, and a check valve between the first and second
25 openings, said check valve being open when compressed air is applied to the first opening and closed in the absence of compressed air at the first opening.